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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/558,352	11/20/2006	Stephan H. Hussman	4507-1026	6488

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EXAMINER	
AMRANY, ADI	
ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
03/28/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No.	Applicant(s)	
	10/558,352	HUSSMAN ET AL.	
	Examiner	Art Unit	
	ADI AMRANY	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-38 and 40-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-38 and 40-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's RCE filed on February 18, 2011, and the corrected claims filed on March 10, 2011, have been entered.

Response to Arguments

2. Applicants' arguments filed in the RCE with respect to the §103 rejection have been fully considered but they are not persuasive. The art rejection based on Rydval has been withdrawn, as the independent claims have been amended to include limitations of claim 5. Rydval does disclose that the secondary circuit is designed for wireless power transfer to a load. The voltage of the resonant circuit is the voltage that will be transferred to the load. Therefore, applicants' contention that there is no load in Rydval is not persuasive.

Applicants argue that the Boys references "teach away from having the primary and secondary operate at different resonant frequencies" (Remarks, page 16, lines 10-12). This reasoning is unclear. Both Boys I and Boys II teach tuning circuits, which means that the two frequencies need to be constantly adjusted. The frequencies are rarely exactly equal to each other. This is because the load (the trolley) is designed to move along the track, which changes the secondary circuit frequency (Boys I, col. 1, line 66 to col. 2, line 19; Boys III, col. 8, lines 51-55).

The purpose of the tuning circuit is to bring the resonant frequency of the secondary circuit back into a match with the fixed frequency of the primary circuit. In order for a circuit to be tuned, it must change frequencies. Therefore, either the pre-change frequency or the post-change frequency must be different than the primary frequency. Applicants admit this by stating, "the teaching is simply to provide capacitance which allows the resonant pickup circuit to operate at the same frequency as the primary circuit" (Remarks, page 16, lines 14-16).

As a result, applicants' statement that the two references teach away from having different operating frequencies is incorrect. There is clearly a difference in the two frequencies. But the purpose of the reference is to eliminate that difference. Applicants have only argued the apparent short-comings of Boys I. The arguments do not address how the combination of references fails to meet the limitations of claim 1.

Boys I senses load current (item 613; col. 6, lines 18-22). Boys III also teaches sensing load power. Boys III indicates that a chance in load (trolley movement) results in a change in frequency (loss of tuning; col. 8, lines 51-55) that can be fixed (tuned) by sensing power requirements (col. 3, lines 51-56). Both Boys I and Boys III are related to methods for maximizing power transfer is a contactless power transfer system. Both references teach that the secondary circuit must be constantly tuned to maintain the maximum power transfer function. Boys I teaches that the system mainly uses frequency sensing; Boys III teaches that the system uses load voltage sensing. Therefore, one skilled in the art would be motivated to use either or both monitoring systems (frequency and/or power) of the references to control a pickup circuit to

maintain maximum power transfer. By sensing more variables, the combined Boys I and Boys III system will be able to more accurately tune the frequency of the secondary circuit.

It is noted that applicants have amended claims 1, 28 and 37 to include the limitations of claim 5, but have not argued against the art rejection of claim 5. Applicants' arguments are limited to the limitations of claim 1 before the RCE amendments. It is unclear how adding the limitation of claim 5, which were rejected in view of Boys I, overcomes the §103 art rejection of the claims.

Lastly, it is noted that the Boys I sensor (fig 6, item 613) is a current sensor. Therefore, Boys I provides motivation to modify the reference to include the load power sensor of Boys III.

Claim Objections

3. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 has been amended to recite the limitation that the controller controls the selective electrical connection/disconnection of the reactive elements. Claim 5 does not recite any limitations not already recited in claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5-12, 16-23, 27-38 and 40-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boys I (US 5,898,579) in view of Boys III (US 5,293,308).

With respect to claim 1, Boys I discloses an inductively coupled power transfer pick-up (fig 5-6; col. 5-7) comprising:

a pick-up resonant circuit (fig 5, all components except for 501) comprising a capacitive element (502) and an inductive element (505) adapted to receive power from a magnetic field associated with a primary conductive path (501) to supply a load (the vehicle; col. 2, lines 3-5), and one of the capacitive element and the inductive element comprises a controlled reactive element (502, 505);

a phase device (col. 4, line 65 to col. 5, line 5) configured to sense the phase of voltage or current in the pick-up resonant circuit;

a sensor (613) configured to sense a power requirement of the load; and

a controller (510; col. 6, lines 14-18) configured to selectively tune or de-tune the pick-up resonant circuit in response to the sensor by selectively electrically connecting or disconnecting the controlled reactive element (via switches 504) to or from the pick-up resonant circuit in each cycle of the voltage or current dependent on the sensed phase (col. 4, line 65 to col. 5, line 5) to vary the effective capacitance of the controlled reactive element to control the transfer of power to the pick-up resonant circuit dependent on the sensed load condition (col. 2, lines 10-19col. 3, lines 19-35; col. 5, lines 49-47; col. 6, lines 24-29).

Boys I discloses that the controller (510) senses the frequency of the system and senses the current of the secondary circuit in order to adjusts the capacitance of the pick-up resonant circuit. Boys I also discloses that the secondary circuit includes a phase device to detect the phase of incoming power and that the frequency/current sensing of the secondary circuit is timed to match the frequency detected by the phase device (col. 4-5, bridging paragraph). This meets the broad limitation of controlling the connection of the capacitors in each cycle of the voltage or current. Boys I does not expressly disclose that the effective capacitance of the circuit is varied dependent on the sensed load power requirements.

Boys III discloses an inductively coupled power transfer pick-up and method (fig 11-28; col. 11-17) comprising: a pick-up resonant circuit (fig 14; col. 11-12) comprising a capacitive element (14112, 14115) and an inductive element (14111, 14121) adapted to receive power from a magnetic field associated with a primary conductive path (primary side of 14111; see figures 3-7) to supply a load (vehicle; abstract), and one of the capacitive element and the inductive element comprises a controlled reactive element (14111; col. 11, line 53 to col. 12, line 3); a sensor configured to sense a power requirement of the load (items 14119-14129; col. 11, line 52 to col. 12, line 3); and a controller (at least items 14123, 14117, 14118) configured to selectively tune or de-tune the pick-up resonant circuit in response to the sensor by varying the effective capacitance of the controlled reactive element to control the transfer of power to the pick-up resonant circuit dependent on the sensed load power requirement (col. 8, lines 51-55; col. 12-13).

Boys III discloses that, based on load power requirements, the effective capacitance of the pick-up circuit is varied. As admitted by the applicants (specification, page 9, lines 14-18), Boys III discloses the pick-up can be tuned by detecting output voltage, which is directly related to load power requirements. It is noted that applicants' specification goes on to state that the Boys III shorting switch and diode are not required in the present application (page 12, lines 3-5). These components (or their absence) is not indicated in the independent claims. Therefore, the improvement discussed in the specification does not overcome the known prior art method of using load power to tune the secondary circuit.

Boys III discloses an ICPT wherein the power requirements of the load are sensed (col. 8, lines 51-55; col. 9, lines 20-38; col. 11, line 53 to col. 12, line 3 and lines 23-26).

Boys I and Boys III are analogous because they are from the same field of endeavor, namely inductive power distribution systems (ICPTs). At the time of the invention by applicants, it would have been obvious to one skilled in the art to modify the frequency monitoring of Boys I with the load power monitoring of Boys III, since Boys III discloses that changing the load characteristics may cause frequency changes. Thus, load power requirements and circuit frequency are related. Since, a change in one (load power) will result in a change in other (frequency), it would be obvious to one skilled in the art to monitor either (or both) in order to tune the circuit.

With respect to claims 2-3, Boys I discloses the controlled reactive element comprises a switching device (504), wherein the controller controls the switching device

so that the apparent capacitance of the reactive element is varied to tune or detune the pick-up resonant circuit (col. 6, line 14-18).

With respect to claim 5, Boys I discloses the controller actuates the switching device to allow the controlled reactive element to be electrically connected to or disconnected from the pick-up resonant circuit dependent on the sensed phase (col. 4-5, bridging paragraph).

With respect to claim 6, Boys I discloses the recited limitations, as discussed below in the rejection of claim 17. Boys I further discloses that it is well known to design the pick-up resonant circuit with an LC resonant circuit (col. 1, lines 21-24). One skilled in the art would recognize that an inductive element can be added to the inductance already present in the pick-up coil.

With respect to claims 7-8 and 18-19, Boys I discloses a frequency sensing device (510) configured to sense the frequency of the pick-up resonant circuit whereby the controller actuates the switching device dependent on the sensed frequency.

With respect to claims 9, 17 and 20, Boys I discloses the reactive element is a capacitor (item 602); the phase sensing device senses a voltage in the pick-up resonant circuit (col. 4, line 65 to col. 5, line 5); and the controller is operable to switch the switching device in a predetermined time period after a sensed voltage zero crossing (obvious). It is also noted that Boys III discloses sensing a voltage in the pick-up circuit.

It is obvious that any controller action occurs a "predetermined time" after the sensed event that triggers the time to start. Boys I also discloses opening the switch after closing it. One skilled in the art would be able to open the switch when the voltage

reaches substantially zero. One skilled in the art, through trial and error, would recognize the optimal timing for when to control the switching device.

With respect to claims 10-11 and 21, it would be obvious to one skilled in the art to select the recited times as the predetermined time, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 12, Boys I discloses that the inductance of the winding is parallel to the tuning capacitor. One skilled in the art would readily understand the advantages of placing an inductor in series/parallel with the capacitor by calculating the resultant filter.

With respect to claim 16, Boys I discloses the controlled reactive element comprises a pick-up coil or is connected in parallel with the pick-up coil (fig 5).

With respect to claims 22-23, it is well known in the art that capacitors placed in parallel can be replaced with one equivalent capacitor, whose capacitance equals the sum of all of the original capacitors.

With respect to claim 27, Boys I discloses the capacitor comprises the tuning capacitor of the pick-up resonant circuit (612).

With respect to claim 28, Boys I and III disclose the ICPT, as discussed above in the rejection of claim 1, and both references further disclose a power supply comprising a resonant converter to provide alternating current to a primary conductive path (Boys I, item 501; Boys III; col. 5, lines 56-65; col. 7, lines 35-56).

With respect to claim 29, Boys I discloses the primary conductive path comprises one or more turns of electrically conductive material (501). See also Boys III (item 3105).

With respect to claim 30, Boys I discloses the inductively coupled power transfer pick-up is for vehicles. It would be obvious that the conductive path is beneath a substantially planar surface (a road) in order to allow the vehicle to travel.

With respect to claim 31, it would be obvious to one skilled in the art that there is a greater magnetic field at one location of the primary path. It would be obvious that the magnetic field is not exactly the same everywhere. Therefore, some portions have greater magnetic fields than others. Boys I figure 6 also shows a coil (610) within the primary path. It would be obvious that the magnetic field would be greater at a point where it is purposefully generated.

With respect to claim 32, it is obvious that Boys I discloses one or more lumped inductances or one or more distributed inductances, since these limitations comprise all possible configurations for inductances. The claim does not define the relative spacing required to meet the limitations of "lumped" and "distributed."

With respect to claims 33-34, Boys discloses the primary path and the pick-up resonant circuit comprise amorphous magnetic material (601, 611).

With respect to claim 35, Boys discloses the pick-up resonant circuit is battery free (see fig 5). The battery in figure 6 is part of the primary conductive path.

With respect to claim 36, it would be obvious to one skilled in the art that it would be more efficient to replace a large capacitor with a super capacitor. The

charge/discharge properties of super capacitors are well known, as is the fact that they take up less room for the same amount of capacitance.

With respect to claims 37-38 and 40-51, Boys I and Boys III disclose the apparatus necessary to complete the recited methods, as discussed above in the rejections of claims 1-3, 5 and 7-11.

6. Claims 13-15 and 24-26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boys I in view of Boys III and applicants' admitted prior art ("APA").

With respect to claims 13 and 24, Boys I discloses a single switch for each capacitor (fig 5). Boys I does not expressly disclose the switching device comprises at least two semiconductor switching elements. It is obvious that all capacitors have two terminals (see Boys I figure 5). APA discloses that the switching device can comprise one or two switches (page 8, lines 14-21) and the change can be accomplished by one skilled in the art. Boys and APA are analogous because they are from the same field of endeavor, namely ICPTs. At the time of the invention by applicants, it would have been obvious to replace two switches with one in order to reduce the number of parts in the circuit.

With respect to claims 14-15 and 25-26, Boys discloses an embodiment using semiconductor switches with anti-parallel diode connections (fig 7). At the time of the invention by applicants, it would have been obvious to apply these switches to the single switch of figure 6 (614), since it has been held that the rearranging of parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70 (CCPA 1950).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADI AMRANY whose telephone number is (571)272-0415. The examiner can normally be reached on Mon-Thurs, from 10am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adi Amrany/
Examiner, Art Unit 2836